

SEQUENCE LISTING

<110> · Seoul National University Industry Foundation

<120> Gene controlling flowering time of plants and method for manipulating flowering time of plant using the same

<160> 9

<170> KopatentIn 1.71

<210> 1

<211> 1140

<212> , DNA

<213> Arabidopsis thaliana

<220>

<221> CDS

<222> (1)..(1137)

<223> cDNA of LOV1 gene

<400> 1

atg gca att gta tcc tcc aca aca agc atc att ccc atg agt aac caa 48
Met Ala Ile Val Ser Ser Thr Thr Ser Ile Ile Pro, Met Ser Asn Gln
1 5 10 15

gtc aac aat aac gaa aaa ggt ata gaa gac aat gat cat aga ggc ggc 96
Val Asn Asn Asn Glu Lys Gly Ile Glu Asp Asn Asp His Arg Gly Gly
20 25 30

caa gag agt cat gtc caa aat gaa gat gaa gct gat gat cat gat cat 144
Gln Glu Ser His Val Gln Asn Glu Asp Glu Ala Asp Asp His Asp His
35 40 45

gac atg gtc atg ccc gga ttt aga ttc cat cct acc gaa gaa gaa ctc 192

Asp Met Val Met Pro Gly Phe Arg Phe His Pro Thr Glu Glu Glu Leu

50 55 60

ata gag ttt tac ctt cgc cga aaa gtt gaa ggc aaa cgc ttt aat gta 240

Ile Glu Phe Tyr Leu Arg Arg Lys Val Glu Gly Lys Arg Phe Asn Val

65 70 75 80

gaa ctc atc act ttc ctc gat ctt tat cgc tat gat cct tgg gaa ctt 288

Glu Leu Ile Thr Phe Leu Asp Leu Tyr Arg Tyr Asp Pro Trp Glu Leu

85 90 95

cct gct atg gcg gcg ata gga gag aaa gag tgg tac ttc tat gtg cca 336

Pro Ala Met Ala Ala Ile Gly Glu Lys Glu Trp Tyr Phe Tyr Val Pro

100 105 110

aga gat cgg aaa tat aga aat gga gat aga ccg aac cga gta acg act 384

Arg Asp Arg Lys Tyr Arg Asn Gly Asp Arg Pro Asn Arg Val Thr Thr

115 120 125

tca gga tat tgg aaa gcc acc gga gct gat agg atg atc aga tcg gag 432

Ser Gly Tyr Trp Lys Ala Thr Gly Ala Asp Arg Met Ile Arg Ser Glu

130 135 140

act tct cgg cct atc gga tta aag aaa acc cta gtt ttc tac tct ggt 480

Thr Ser Arg Pro Ile Gly Leu Lys Lys Thr Leu Val Phe Tyr Ser Gly

145 150 155 160

aaa gcc cct aaa ggc act cgt act agt tgg atc atg aac gag tat cgt 528

Lys Ala Pro Lys Gly Thr Arg Thr Ser Trp Ile Met Asn Glu Tyr Arg

165 170 175

ctt ccg cac cat gaa acc gag aag tac caa aag gct gaa ata tca ttg 576

Leu Pro His His Glu Thr Glu Lys Tyr Gln Lys Ala Glu Ile Ser Leu

180 185 190

tgc cga gtg tac aaa agg cca gga gta gaa gat cat cca tcg gta cca 624

Cys Arg Val Tyr Lys Arg Pro Gly Val Glu Asp His Pro Ser Val Pro
195 200 205

cgt tct ctc tcc aca aga cat cat aac cat aac tca tcg aca tca tcc 672
Arg Ser Leu Ser Thr Arg His His Asn His Asn Ser Ser Thr Ser Ser
210 215 220

cgt tta gcc tta aga caa caa caa cac cat tca tcc tcc tct aat cat 720
Arg Leu Ala Leu Arg Gln Gln Gln His His Ser Ser Ser Ser Asn His
225 230 235 240

tcc gac aac aac ctt aac aac aac aac atc aac aat ctc gag aag 768
Ser Asp Asn Asn Leu Asn Asn Asn Asn Ile Asn Asn Leu Glu Lys
245 250 255

ctc tcc acc gaa tat tcc ggc gac ggc agc aca aca aca acg acc aca 816
Leu Ser Thr Glu Tyr Ser Gly Asp Gly Ser Thr Thr Thr Thr Thr Thr
260 265 270

aac agt aac tct gac gtt acc att gct cta gcc aat caa aac ata tat 864
Asn Ser Asn Ser Asp Val Thr Ile Ala Leu Ala Asn Gln Asn Ile Tyr
275 280 285

cgt cca atg cct tac gac aca agc aac aac aca ttg ata gtc tct acg 912
Arg Pro Met Pro Tyr Asp Thr Ser Asn Asn Thr Leu Ile Val Ser Thr
290 295 300

aga aat cat caa gac gat gat gaa act gcc att gtt gac gat ctt caa 960
Arg Asn His Gln Asp Asp Asp Glu Thr Ala Ile Val Asp Asp Leu Gln
305 310 315 320

aga cta gtt aac tac caa ata tca gat gga gcg aca acg cta atg cct 1008
Arg Leu Val Asn Tyr Gln Ile Ser Asp Gly Ala Thr Thr Leu Met Pro
325 330 335

caa act caa gcg gcg tta gct atg aac atg att cct gca gga acg att 1056

Gln Thr Gln Ala Ala Leu Ala Met Asn Met Ile Pro Ala Gly Thr Ile

340

345

350

cca aac aat gct ttg tgg gat atg tgg aat cca ata gta cca gat gga 1104

Pro Asn Asn Ala Leu Trp Asp Met Trp Asn Pro Ile Val Pro Asp Gly

355

360

365

aac aga gat cac tat act aat att cct ttt aag taa

1140

Asn Arg Asp His Tyr Thr Asn Ile Pro Phe Lys

370

375

<210> 2

<211> 379

<212> PRT

<213> Arabidopsis thaliana

<400> 2

Met Ala Ile Val Ser Ser Thr Thr Ser Ile Ile Pro Met Ser Asn Gln

1

5

10

15

Val Asn Asn Asn Glu Lys Gly Ile Glu Asp Asn Asp His Arg Gly Gly

20

25

30

Gln Glu Ser His Val Gln Asn Glu Asp Glu Ala Asp Asp His Asp His

35

40

45

Asp Met Val Met Pro Gly Phe Arg Phe His Pro Thr Glu Glu Glu Leu

50

55

60

Ile Glu Phe Tyr Leu Arg Arg Lys Val Glu Gly Lys Arg Phe Asn Val

65

70

75

80

Glu Leu Ile Thr Phe Leu Asp Leu Tyr Arg Tyr Asp Pro Trp Glu Leu

85

90

95

Pro Ala Met Ala Ala Ile Gly Glu Lys Glu Trp Tyr Phe Tyr Val Pro

100

105

110

Arg Asp Arg Lys Tyr Arg Asn Gly Asp Arg Pro Asn Arg Val Thr Thr

115

120

125

Ser Gly Tyr Trp Lys Ala Thr Gly Ala Asp Arg Met Ile Arg Ser Glu

130

135

140

Thr Ser Arg Pro Ile Gly Leu Lys Lys Thr Leu Val Phe Tyr Ser Gly
 145 150 155 160
 Lys Ala Pro Lys Gly Thr Arg Thr Ser Trp Ile Met Asn Glu Tyr Arg
 165 170 175
 Leu Pro His His Glu Thr Glu Lys Tyr Gln Lys Ala Glu Ile Ser Leu
 180 185 190
 Cys Arg Val Tyr Lys Arg Pro Gly Val Glu Asp His Pro Ser Val Pro
 195 200 205
 Arg Ser Leu Ser Thr Arg His Asn His Asn Ser Ser Thr Ser Ser
 210 215 220
 Arg Leu Ala Leu Arg Gln Gln Gln His His Ser Ser Ser Ser Asn His
 225 230 235 240
 Ser Asp Asn Asn Leu Asn Asn Asn Asn Ile Asn Asn Leu Glu Lys
 245 250 255
 Leu Ser Thr Glu Tyr Ser Gly Asp Gly Ser Thr Thr Thr Thr Thr
 260 265 270
 Asn Ser Asn Ser Asp Val Thr Ile Ala Leu Ala Asn Gln Asn Ile Tyr
 275 280 285
 Arg Pro Met Pro Tyr Asp Thr Ser Asn Asn Thr Leu Ile Val Ser Thr
 290 295 300
 Arg Asn His Gln Asp Asp Asp Glu Thr Ala Ile Val Asp Asp Leu Gln
 305 310 315 320
 Arg Leu Val Asn Tyr Gln Ile Ser Asp Gly Ala Thr Thr Leu Met Pro
 325 330 335
 Gln Thr Gln Ala Ala Leu Ala Met Asn Met Ile Pro Ala Gly Thr Ile
 340 345 350
 Pro Asn Asn Ala Leu Trp Asp Met Trp Asn Pro Ile Val Pro Asp Gly
 355 360 365
 Asn Arg Asp His Tyr Thr Asn Ile Pro Phe Lys
 370 375

<210> 3
 <211> 2606
 <212> DNA
 <213> Arabidopsis thaliana

<220>
 <221> gene
 <222> (1)..(2606)
 <223> genomic DNA of LOV1 gene

<400> 3

atggcaattg tatctccac aacaagcatc attcccatga gtaaccaagt caacaataac	60
gaaaaaggta tagaagacaa tgatcataga ggcgggccaag agagtcattgt ccaaaatgaa	120
gatgaagctg atgatcatga tcatgacatg gtcatgcccg gatttagatt ccatcctacc	180
gaagaagaac tcatagagtt ttaccttcgc cgaaaagttg aaggcaaacg ctttaatgta	240
gaactcatca ctttctcga tctttatgc tatgatcctt gggaacttcc tggtaaata	300
acattcacat aaacacacat aaatcatcic aaactatttg gaaatcttaa tttctattca	360
tatgtaaga tctttctct cttttatcac ttctctctc tatttcttt ttttaacct	420
atatatgtac ctacctcctt atgaagtatt actatgtcga tctttaacaa ttctcaatat	480
ctttaaacgc ttctccctct ttagtctct tcttaaatca acctaattaa acaacctaca	540
tatatatcat aagatatata aatatgtgta tgttttcata attagcttat gtatgtttaa	600
tcatagatat atgtatatgc agctatggcg gcgataggag agaaagagtg gtacttctat	660
gtgccaagag atcggaataa tagaaatgga gatagaccga accgagtaac gacttcagga	720
tattggaaa ccaccggagc tgataggatg atcagatcgg agacttctcg gcctatcgga	780
ttaaagaaaa ccttagtttt ctactctggt aaagccctca aaggcactcg tactagttag	840
atcatgaacg agtatcgtct tccgcacat gaaaccgaga agtaccaaaa ggtataaatt	900
ctactataac tctatatata tctattcat acatacatag atataacct agctaggtag	960
tgaggccttt aaaattgaaa ttaatcccta gacagtttga atttttctt tttagactag	1020
ttttatttat ttattttgga attgattcga taagatcaaa aatacttgt aatggactaa	1080
atgtcaggcg gcgtttgctc ttaaatccag aaaaatgtc atgtcatatg cgtgaactct	1140
ttaaattgct agacatggcc catatgttat agtagaatac attaatagat agatgcatac	1200
acatatatat aaacacacaa gtatcacact cgacattcat ataccttaar tctgcagaga	1260
catagttagt tttcttaca atttatgaca tgaatgttcc tgctcttctt cacattaatt	1320
catgtcttct atttaagta cccaacattt ttgaaataa ttggcatat atgaattata	1380
ccaacatatt tatatcgaa catttaaaat ctatacgaat gataacggtt tatggagtag	1440
accgaaaaaa tattatgtat acggaaaatg acaatggata gataaataca tttttgggc	1500
tttttcgact tatatgtcgt caccatttga aaccataaat ttataaaatt ttctatgtat	1560
atatatgata ttatgatgta tgcataagac agctaaaaca acagggttga cataattatc	1620
tatgtgtatg tattgcacat tcaattgtac taataaaact aaaattacgc aattaaatat	1680

ataaaaaata ataaatataa tcattttaat tatatttgca ttgttagtc atatgatagt	1740
actctaaatt tcttctaaac gtgctatctt ttttgctaa tgctaacttt acatagtgtg	1800
tgaatcttct ttcaaaacca taatttcgat aaatgatatt ttcatagat attgttagtc	1860
tatatitgat aatttgatat atgtatcaag tctctaatca atgtgctcat gtataattat	1920
aggctgaaat atcattgtgc cgagtgtaca aaaggccagg agtagaagat catccatcgg	1980
taccacgttc tctctccaca agacatcata accataactc atcgacatca tcccgtttag	2040
ccttaagaca acaacaacac cattcatcct cctctaatca ttccgacaac aaccttaaca	2100
acaacaacaa catcaacaat ctgagaagc tctccaccga atattccggc gacggcagca	2160
caacaacaac gaccacaac agtaactctg acgttaccat tgctctagcc aatcaaaaca	2220
tatatgttcc aatgccttac gacacaagca acaacacatt gatagtctct acgagaaatc	2280
atcaagacga tgatgaaact gccattgttg acgatcttca aagactagtt aactacaaa	2340
tatcagatgg aggtaacatc aatcaccaat actttcaaat tgctcaacag ttcatcata	2400
ctcaacaaca aaatgctaac gcaaacgcgt tacaattggt ggctgcggcg actacagcga	2460
caacgctaat gcctcaaact caagcggcgt tagctatgaa catgattcct gcaggaacga	2520
ttccaacaaa tgctttgtgg gatatgtgga atccaatagt accagatgga aacagagatc	2580
actatactaa tattcctttt aagtaa	2606

<210> 4

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Sense primer of LOV1

<400> 4

aatagatctg gtacgcgaca tccatattga aa 32

<210> 5

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense primer of LOV1

<400> 5

aatagatctc atgggaatga tgcttggtg g

31

<210> 6

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Sense primer of FLC

<400> 6

cccgtaact gaacccaaac ctgagga

27

<210> 7

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense primer of FLC

<400> 7

ccactagtgc cccttatcag cgga

24

<210> 8

<211> 27

<212> DNA
<213> Artificial Sequence

<220>
<223> Sense primer of AGL20

<400> 8
cccgtaaca tggtagggg caaaact

27

<210> 9
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense primer of AGL20

<400> 9
cccgtaact cactttcttg aagaacaagg

30